REMARKS

This Amendment is filed in response to the Office Action dated January 16, 2004. This application should be allowed and the case passed to issue. No new matter is raised by this amendment. The amendment to claim 1 is supported by claims 5 and 10, as originally filed, and the specification at page 11, lines 6-20 and page 15, lines 11-24. Claims 7 and 27 were amended to correct informalities. The amendments to the specification also correct informalities.

Claims 1-4, 6-9, and 11-35 are pending in this application. Claims 1, 3-11, 14, 15, 27, 29, and 31 have been rejected. Claims 2, 12, 13, 16-26, 28, 30, and 32-35 have been withdrawn. Claims 1, 7, and 27 have been amended. Claims 5 and 10 have been canceled.

Restriction

Applicants traverse the Examiner's determination that there are no generic claims in the application. Claim 1, directed to a single cell, is generic to claims 3-15, as single cell claims 3-15 contain all of the limitations of claim 1. Claim 2, directed to a single cell, is generic to claims 16-26, as single cell claims 16-26 contain all the limitations of claim 2. Claim 33, directed to a method of manufacture of a single cell, is generic to claims 34 and 35.

Specification

The specification was objected to because of several informalities. These objections are traversed, and reconsideration and withdrawal thereof respectfully requested. The specification has been amended in accordance with the Examiner's recommendation.

Drawings

The drawings were objected to because the "Splayed" in Fig. 5 should be "Sprayed." This objection is traversed, and reconsideration and withdrawal respectfully requested. A

Replacement Sheet and Annotated Marked-up Drawing are attached to this Amendment. The word "Splayed" has been changed to "Sprayed," as recommended by the Examiner.

Claim Rejections Under 35 U.S.C. § 112

Claims 1, 3-11, 14, 15, 27, 29, and 31 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Claims 1, 3-11, 14, 15, 27, 29, and 31 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

The Examiner asserted that "the adhering cathode layer has a structure denser than the electricity collecting cathode layer" in claim 1 does not appear to be enabled by the specification. The Examiner further asserted that it is unclear what the term "denser" means. As regards claim 7, the Examiner averred that it is unclear what total volume is being referred to. The Examiner further considered there to be a lack of antecedent basis for "single cells" in claim 27. These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested.

Applicants submit that original claim 1 is definite and fully enabled by the specification. However, in order to advance prosecution of this application, the limitation "[h]as a structure denser than the electricity collecting cathode layer" has been deleted from claim 1. Claim 1 has been further amended to recite that the adhering layer is formed by using a PVD method and that the electricity collecting cathode layer is formed by using one of a printing method and a spray coating method. As is known to one of ordinary skill in this art, PVD methods would provide a denser layer than a printing or spray coating method. Therefore, it is clear to one of ordinary skill in this art that the adhering cathode layer of the present invention is denser than the electricity collecting cathode layer.

In addition, Applicants traverse the Examiner's determination that the term "denser" would not apply to a layer that does not have uniform density and that it is unclear what the density of the electricity collecting electrode layers would be since a net form structure is not uniformly dense. As one of ordinary skill in this art knows, the density of a layer can be determined using conventional means even though a layer may not be uniformly dense. As one of ordinary skill in this art knows, the density of porous materials (such as the instant electrode layers) can be determined by conventional means.

As regards claims 7 and 27, these claims have been amended to correct the informalities noted by the Examiner.

Claim Rejections Under 35 U.S.C. § 102

Claims 1, 3, 4, 7, and 9-11 were rejected under 35 U.S.C. § 102(b) as being anticipated by JPO Machine Translation for JP 09-180731 (JP '731). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention as claimed and the cited prior art.

An aspect of the invention, per claim 1, is a single cell comprising a solid electrolyte layer and an air electrode. The air electrode comprises an adhering cathode layer formed on one surface of the solid electrolyte layer and configured to show a function to allow the air electrode and the solid electrolyte layer to adhere electrically and mechanically to each other. In addition, the air electrode comprises an electricity collecting cathode layer formed on the adhering cathode layer and configured to show an electricity collecting function of the air electrode. The single cell further comprises a fuel electrode formed on the other surface of the solid electrolyte layer. The adhering cathode is formed by using a PVD method and configures a three-phase interface composed of the solid electrolyte layer, reactive gas and the air electrode or a two-phase

interface composed of the solid electrolyte layer and the air electrode. The electricity collecting cathode layer is formed by using one of a printing method and a spray coating method, is thicker than the adhering cathode layer, and has pores providing the reactive gas to the three-phase interface or the two-phase interface. A ratio (tc1/tc2) of a thickness (tc1) of the adhering cathode layer to a thickness (tc2) of the electricity collecting cathode layer ranges from 1/1000 to 1/500, and tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$.

The Examiner asserted that JP `731 teaches the claimed single cell including the solid electrolyte layer 30 and a two layer air electrode 31, 33.

JP `731 does not anticipate claim 1 because JP`731 does not disclose that a ratio (tc1/tc2) of a thickness (tc1) of the adhering cathode layer to a thickness (tc2) of the electricity collecting cathode layer ranges from 1/1000 to 1/500, and/or that regions 30 and 31 of the air electrode are formed by two different methods, as required by claim 1. As is known to one of ordinary skill in this art, PVD layer forming methods are not equivalent to printing or spray coating methods. PVD methods form a denser layer than printing or spray coating methods. There is no suggestion in JP `731 that one layer of the air electrode is formed by a printing or spray coating method and that the other layer of the air electrode is formed by a PVD method.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321

(Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because JP`731 does not disclose that a ratio (tc1/tc2) of a thickness (tc1) of the adhering cathode layer to a thickness (tc2) of the electricity collecting cathode layer ranges from 1/1000 to 1/500 and/or that the two air electrode layers are formed by different methods, as required by claim 1, JP `731 does not anticipate claim 1.

Applicants further submit that JP `731 does not suggest the claimed single cell.

Claims 1, 4, 11, 14, and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Khandkar (U.S. Patent No. 5,171,645). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Khandkar does not anticipate the claimed single cell because Khandkar does not disclose that a ratio (tc1/tc2) of a thickness (tc1) of an adhering cathode layer to a thickness (tc2) of an electricity collecting cathode layer ranges from 1/1000 to 1/500, tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, as required by claim 1.

Applicants further submit that Khandkar does not suggest the claimed single cell.

Claims 1, 4-6, 11, 14, 15, and 29 were rejected under 35 U.S.C. § 102(b) as being anticipated by Jankowski et al. (U.S. Patent No. 5,753,645). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Jankowski et al. do not anticipate the claimed single cell and fuel cell because Jankowski et al. do not disclose that tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, such as PVD and printing or spraying, as required by claim 1.

Applicants further submit that Jankowski et al. do not suggest the claimed single cell and fuel cell.

Claims 1, 4, 6, 11, 27, 29, 31 were rejected under 35 U.S.C. § 102(e) as being anticipated by Badding et al. (U.S. Patent Application No. 2001/0044041). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Badding et al. do not anticipate the claimed single cell, cell plate, and fuel cell because Badding et al. do not disclose that a ratio (tc1/tc2) of a thickness (tc1) of an adhering cathode layer to a thickness (tc2) of an electricity collecting cathode layer ranges from 1/1000 to 1/500, tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, such as PVD and printing or spraying, as required by claim 1.

Applicants further submit that Badding et al. do not suggest the claimed single cell, cell plate, and fuel cell.

Claims 1, 4, and 11 were rejected under 35 U.S.C. § 102(e) as being anticipated by Doshi et al. (U.S. Patent Application No. 2002/0177031). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Doshi et al. do not anticipate the claimed single cell because Doshi et al. do not disclose that a ratio (tc1/tc2) of a thickness (tc1) of an adhering cathode layer to a thickness (tc2) of an electricity collecting cathode layer ranges from 1/1000 to 1/500, tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, as required by claim 1.

Applicants further submit that Doshi et al. do not suggest the claimed single cell and fuel cell.

Claim Rejections Under 35 U.S.C. § 103

Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Badding et al. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Claim 8 depends from claim 1. As explained *supra* Badding et al. do not suggest claim 1, therefore, claim 8 is allowable for at least the same reasons as claim 1.

Claims 27 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jankowski et al. in view of Nishioka et al. (U.S. Patent No. 5,543,241). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The Examiner relied on the Nishioka et al. teaching of fuel cells arranged two-dimensionally and layered three-dimensionally to yield a high voltage fuel cell to conclude that it would have been obvious to modify the fuel cell of Jankowski et al.

The combination of Nishioka et al. and Jankowski et al., however, does not suggest the claimed cell plate and fuel cell because Nishioka et al. do not cure the deficiencies of Jankowski et al., as discussed *supra*. Nishioka et al. do not disclose that tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, such as PVD and printing or spraying, as required by claim 1.

Claims 27, 29, and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Khandkar in view of Nishioka et al. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The Examiner relied on the Nishioka et al. teaching of fuel cells arranged two-dimensionally and layered three-dimensionally to yield a high voltage fuel cell to conclude that it would have been obvious to modify the fuel cell of Khandkar.

The combination of Nishioka et al. and Khandkar however, does not suggest the claimed cell plate and fuel cell because Nishioka et al. do not cure the deficiencies of Khandkar, as discussed *supra*. Nishioka et al. do not disclose that a ratio (tc1/tc2) of a thickness (tc1) of an adhering cathode layer to a thickness (tc2) of an electricity collecting cathode layer ranges from 1/1000 to 1/500, tc1 and an average diameter (dc) of constituent particles of the air electrode satisfy a relation of $0.01dc \leqq tc1 \leqq 0.5dc$, and/or multiple layers of the air electrode formed by two different methods, as required by claim 1.

The dependent claims are allowable for at least the same reasons as claim 1 and further distinguish the claimed invention.

In view of the above remarks, Applicants submit that this application should be allowed and the case should be passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT, WILL & EMERY

Bernard P. Codd

Bernard P. Codd
Registration No. 46,429

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 BPC:BPC
Facsimile: (202) 756-8087
Date: May 17, 2004

Annotated Marked-up Drawings

FIG.5

Table. 1

	Air electrode (Ag)		Fuel electrode (Ni)		Peeling property	Cell property (i=0.4A/cm^2 hour)
	Lower layer	Upper layer	Lower layer	Upper layer		
Example 1	Sputtering film : 50 nm	~~Splayed~~ Sprayed film : 15 μm	Sputtering film : 50 nm	~~Splayed~~ Sprayed film : 35 μm	OK	0.130W/cm^2
Comparative example 1	——	~~Splayed~~ Sprayed film : 15 μm	——	~~Splayed~~ Sprayed film : 35 μm	OK	0.12W/cm^2
Example 2	~~Splayed~~ Sprayed film : 0.1 μm	~~Splayed~~ Sprayed film : 15 μm	~~Splayed~~ Sprayed film : 0.1 μm	~~Splayed~~ Sprayed film : 35 μm	OK	0.127W/cm^2
Comparative example 2	——	~~Splayed~~ Sprayed film : 15 μm	——	~~Splayed~~ Sprayed film : 35 μm	×	0.123W/cm^2
Comparative example 3	Sputtering film : 2 μm	~~Splayed~~ Sprayed film : 15 μm	Sputtering film : 2 μm	~~Splayed~~ Sprayed film : 35 μm	×	0.11W/cm^2

*) The lower layer and the upper layer in the air electrode are an adhering cathode layer and an electricity collecting cathode layer respectively.

*) The lower layer and the upper layer in the fuel electrode are an adhering anode layer and an electricity collecting anode layer respectively.